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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/286,418	04/06/1999	TAKAYUKI KIFUKU	Q53818	4951

7590

07/17/2002

SUGHRUE MION ZINN MACPEAK & SEAS  
2100 PENNSYLVANIA N W  
WASHINGTON, DC 20037

EXAMINER
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BROADHEAD, BRIAN J

ART UNIT	PAPER NUMBER
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3661

DATE MAILED: 07/17/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/286,418

Applicant(s)

KIFUKU, TAKAYUKI

Examiner

Brian J. Broadhead

Art Unit

3661

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 April 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2 and 4-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 April 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 02 November 2000 is: a) ☒ approved b) ☐ disapproved by the Examiner  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Drawings*

1. The corrected or substitute drawings were received on 4-29-02. These drawings are acceptable.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-2, and 4-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kifuku et al., 5740040, in view of Setaka et al., 4881414.

As per claim 1, Kifuku et al. discloses means of computing an estimated value of friction of the steering system based on the steering force of a driver on lines 12-20, on column 2; and means of compensating for the friction based on this estimated value of friction on lines 34-39, on column 20. Kifuku et al. does not implicitly disclose that the friction found is the static friction. Setaka et al. teaches of determining the static friction based on the steering force of a driver on lines 12-15, on column 2. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the static friction of Setaka et al. in the invention of Kifuku et al. because such modification would improve the feeling of steering as stated on line 3, on column 5, of Kifuku et al.

As per claim 2, Kifuku et al. discloses the friction of the steering system is estimated by extracting the edge of the steering force detection value on lines 45-46, on column 20.

As per claim 4, Kifuku et al. discloses the friction of the steering system is estimated by extracting the edge of a motor current on lines 25-28, on column 21.

As per claim 5, Kifuku et al discloses the friction of the steering system is estimated by extracting a edge of the steering force detection value, the motor angular velocity, the motor back electromotive forces, the steering angular velocity, or the motor current wherein the extraction of the edge is carried out through a high frequency pass filter on lines 5-12, on column 6.

As per claim 6, Kifuku et al. discloses the time constant of the high-frequency pass filter is made almost equal to the mechanical time constant or acceleration constant of the motor on lines 55-62, on column 13.

As per claim 7, Kifuku et al. discloses the friction of the steering system is estimated by extracting an edge of the steering force detection value, the motor angular velocity, the motor back electromotive force, the steering angular velocity, or the motor current, and the static friction of the steering system is estimated by multiplying an extracted value of the edge by a predetermined function of the motor angular velocity, motor back electromotive force or steering angular velocity on lines 33-39, on column 20.

As per claim 8, Kifuku et al. discloses there is an upper limit for the friction estimated value on lines 1-5, on column 21.

As per claim 9, Kifuku et al. discloses the friction compensation having a term proportional to the friction estimated value obtained by the positive feedback of the friction estimated value is computes and the friction of the steering system is compensated by the friction compensation on lines 47-52, on column 20.

As per claim 10, Kifuku et al. discloses the gain of the positive feedback is set such that the friction estimated value and the motor output torque become almost equal to each other on lines 47-52, column 20. Compensating for a friction is producing a force to counteract the frictional force. They would be equal but opposite in direction.

As per claim 11, Kifuku et al. discloses the friction compensation obtained through the means of compensating for the friction is obtained from both a term proportional to the friction estimated value and a term for compensating for the nonlinearity of the motor or a motor reduction gear on lines 47-52, on column 20, and in figure 33.

As per claim 12,13, 14, 15, 16, and 17, Kifuku et al. discloses the term for compensating for the nonlinearity of the motor or the motor reduction gear and an upper limit is used when the friction estimated value is larger than a predetermined value and they are changed based on car speed or engine speed in figure33.

As per claim 18, Kifuku et al. discloses the dynamic friction or inertia of the steering system is compensated based on the angular velocity or angular acceleration of the motor or steering in figure 31, item 13.

As per claim 19 and 20, Kifuku et al. discloses a term for compensating for dynamic friction, a term for compensating for static friction, and a term for the nonlinearity of the motor are weighed so that at least one of them is used in figure 31.

***Response to Arguments***

4. Applicant's arguments with respect to claims 1-2, and 4-20 have been considered but are moot in view of the new ground(s) of rejection. The examiner sees the static friction correction as already being part of conventional power steering assist systems. Current systems already use torque sensors to detect driver force. This driver force is going to include static friction when the driver attempts to move the steering wheel.

***Conclusion***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

6. Io, 4784002, discloses a torque sensor.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Broadhead whose telephone number is 703-308-9033. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William A. Cuchlinski can be reached on 703-308-3873. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7687 for regular communications and 703-305-7687 for After Final communications.

Application/Control Number: 09/286,418

Page 6

Art Unit: 3661

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.

BJB  
July 14, 2002

*Jaime L. Jones*  
JAMES L. JONES  
PATENT EXAMINER